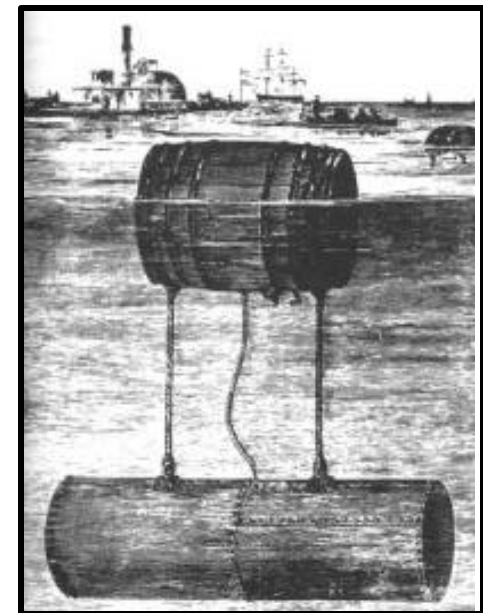




Mine Warfare ...

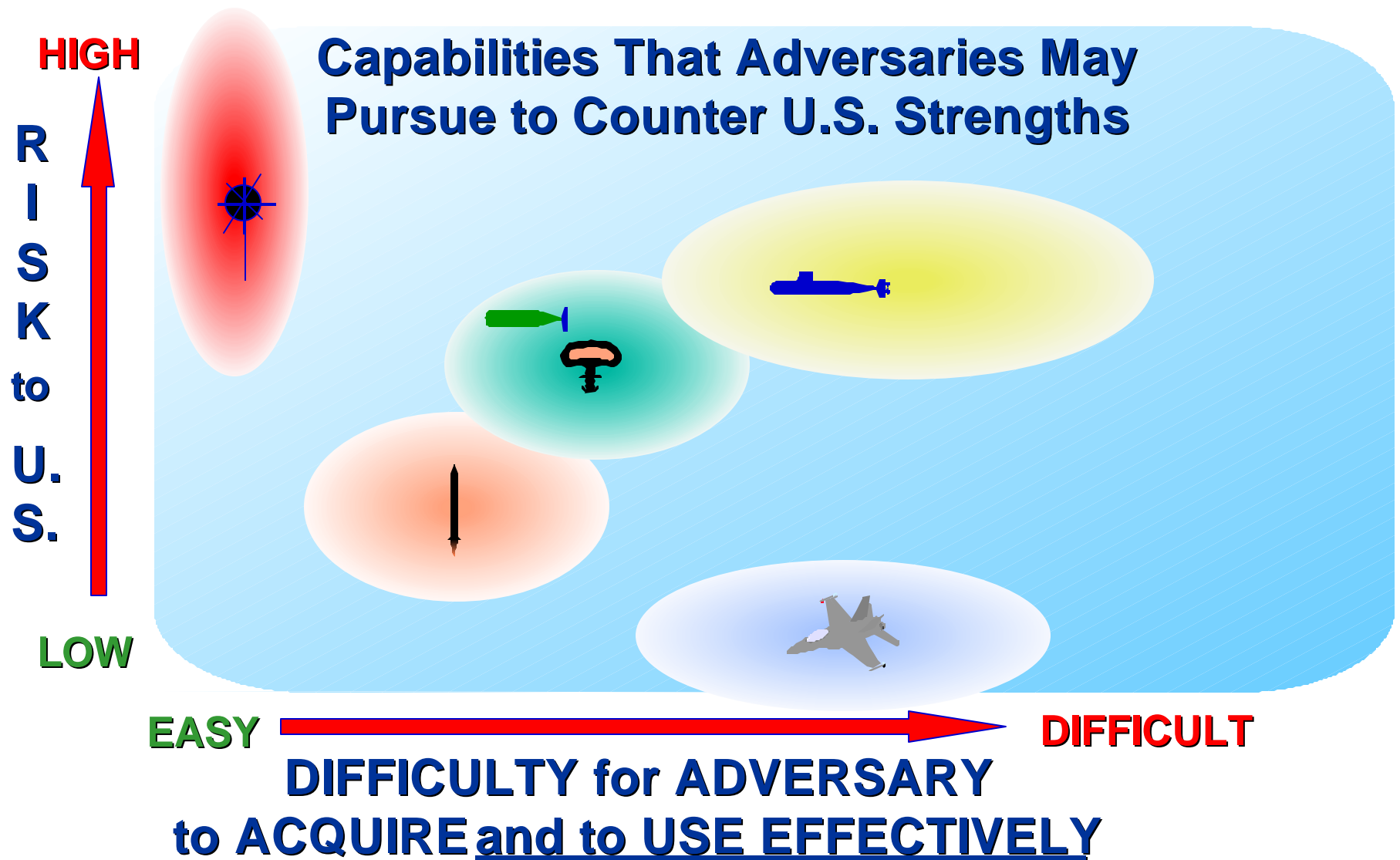
An Enduring Challenge



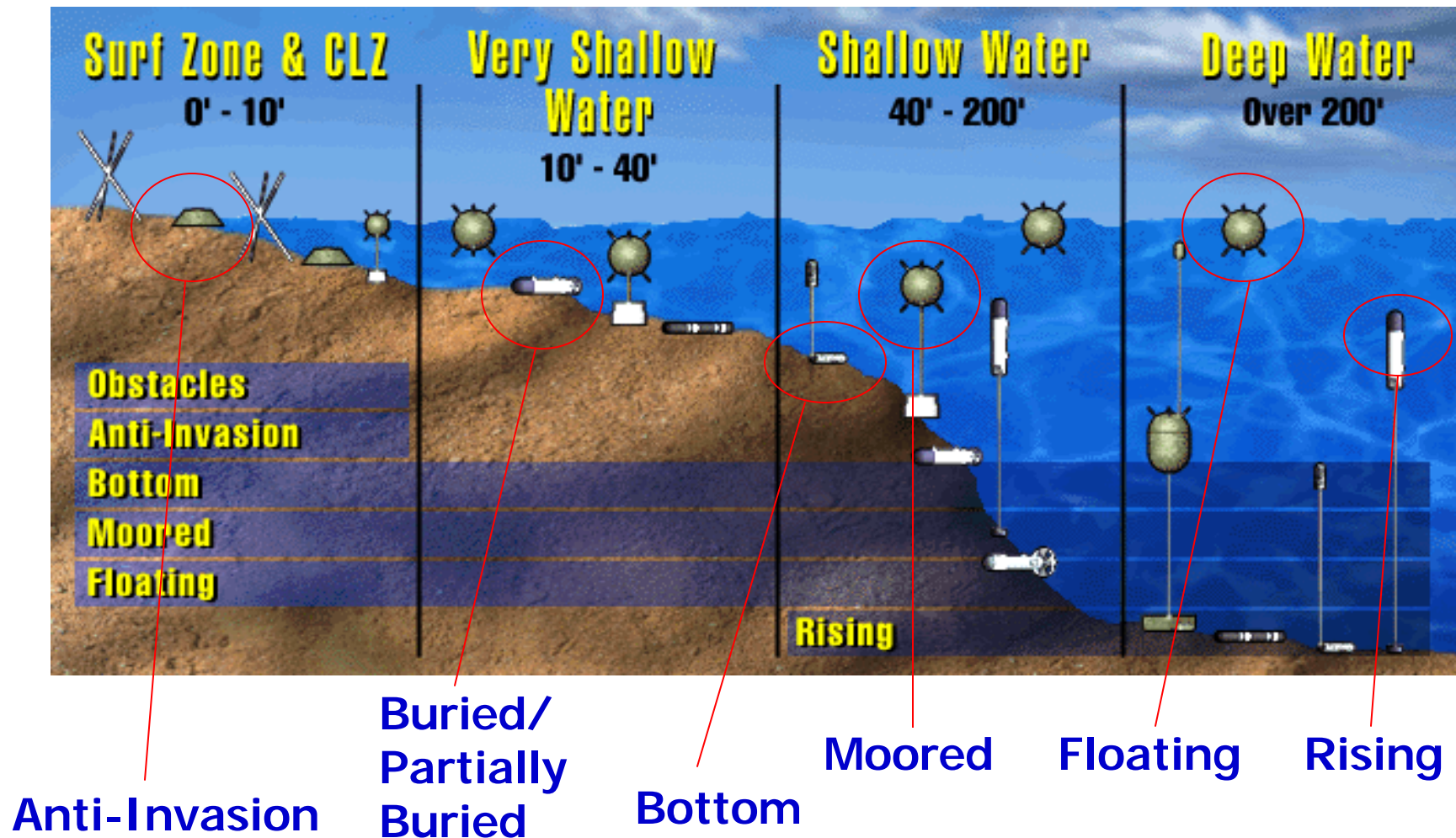
Rear Admiral William J. Marshall, III
Commander Steven E. Lehr

National Defense Industry Association
3 November 1998

The Asymmetric Threat

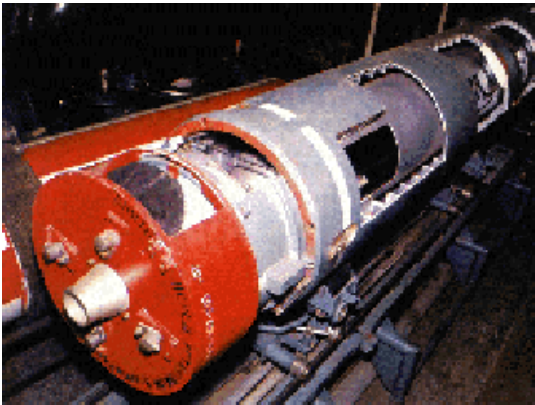


Complex Environment



What Is the Threat?

Moored



RISING MINE (CHINA)



M-08 (IRAN)

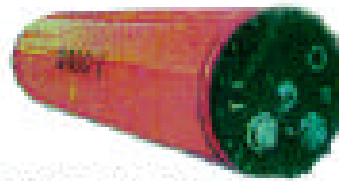
Bottom



ROCKAN (SWEDEN)



MANTA (ITALY)



MR-80 (ITALY)

Anti-Invasion



TM-46 (FSU)



VS 1.6 (IRAN)

The Growing Threat



- **Broad Spectrum**
 - Low Cost/Low Tech-High Volume
 - High Tech/Med Cost-Stealth & Anti-MCM
 - WWII Vintage to Advanced Technologies

- **Readily Available**
 - Over 50 Countries
(40% Increase in 10 Yrs)
 - Over 300 Types
(75% Increase in 10 Yrs)
 - 32 Countries Produce
(60% Increase in 10 Yrs)
 - 24 Countries Export
(60% Increase in 10 Yrs)

A World Class MCM Force

- Ships and Aircraft
 - MCM-1 Avenger Class
 - MHC-51 Osprey Class
 - MCS-12 Class Conversion
 - Two MH-53 Squadrons
- Sensors
 - SQQ-32 Minehunting Sonar
 - SLQ-48 Mine Neutralization System
 - AQS-14 Minehunting Sonar
- VSW MCM Detachment
 - MK7 Marine Mammal System
 - MK4 Marine Mammal System
- Miscellaneous
 - MEDAL, AMCM PMA



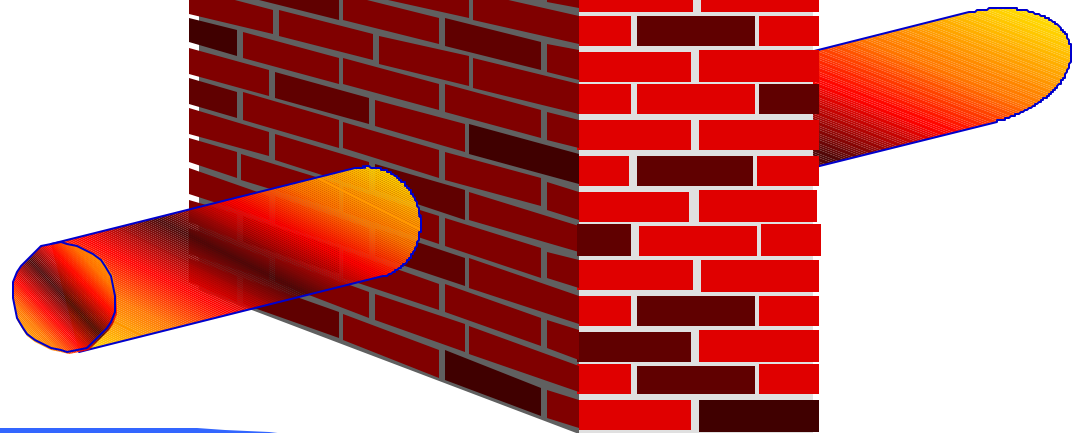
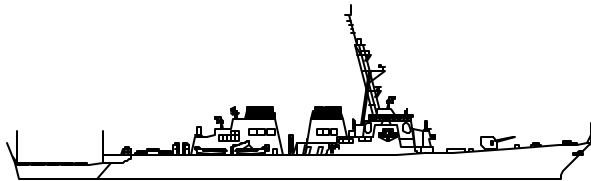
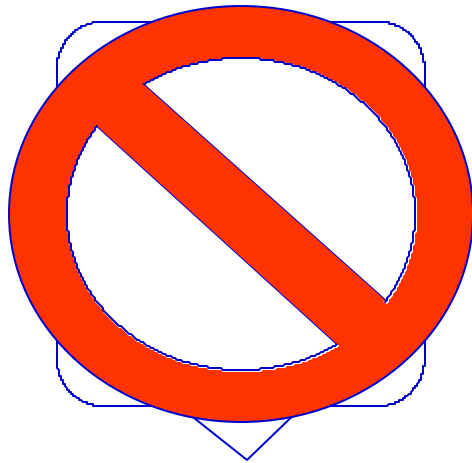
Still Not Good Enough...Must Go Organic

- What is Organic?
 - An Integral Part...
 - A Capability That Is Carried in Forward Deployed Forces to Allow Early MCM Operations and ...
 - The Ability to Conduct MCM Operations Enroute

-

Defining Organic MCM....

NOMBOS

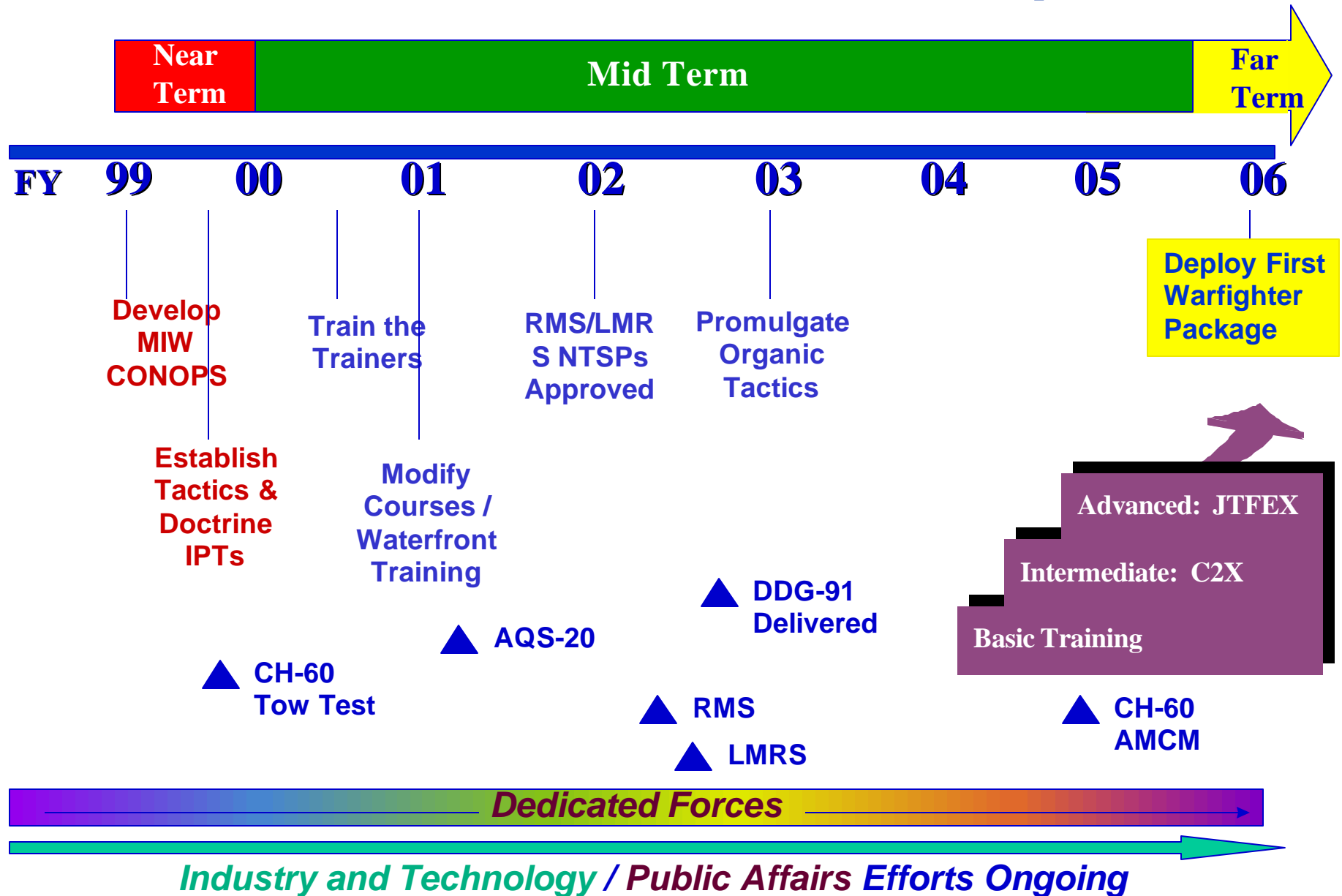


...Minimize Impact on Speed of Advance

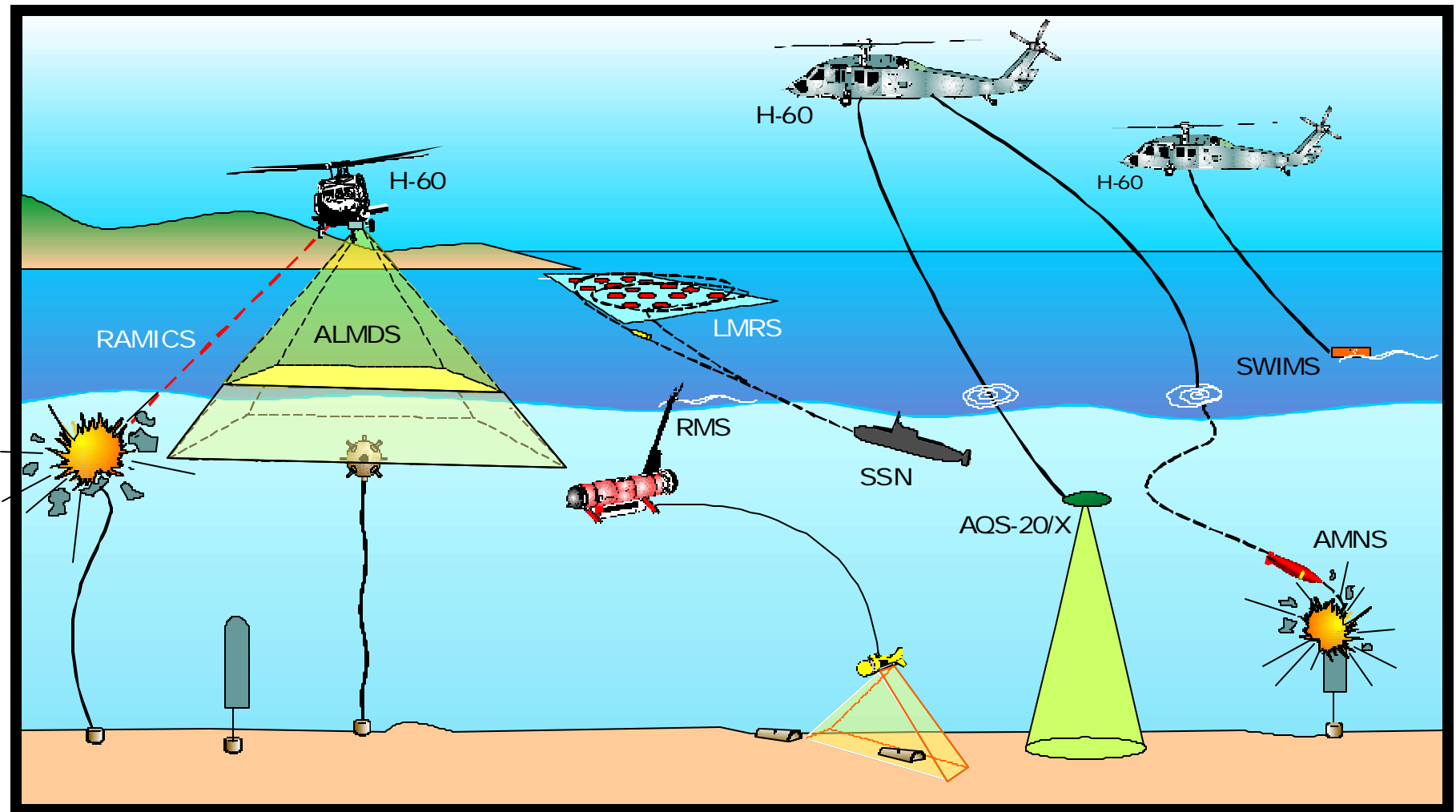
Navy MCM Strategy

- Near-Term: 1998-99
 - Increase MCM Presence
 - Develop Fleet Engagement Strategy
- Mid-Term: 2000-05
 - Introduce Organic Systems
 - Implement Fleet Engagement Strategy
- Far-Term: From 2006 Onward
 - Full Integrated Warfighting Packages to Joint Task Forces

Mine Warfare Roadmap



Organic MCM Concept



Delivering Capability

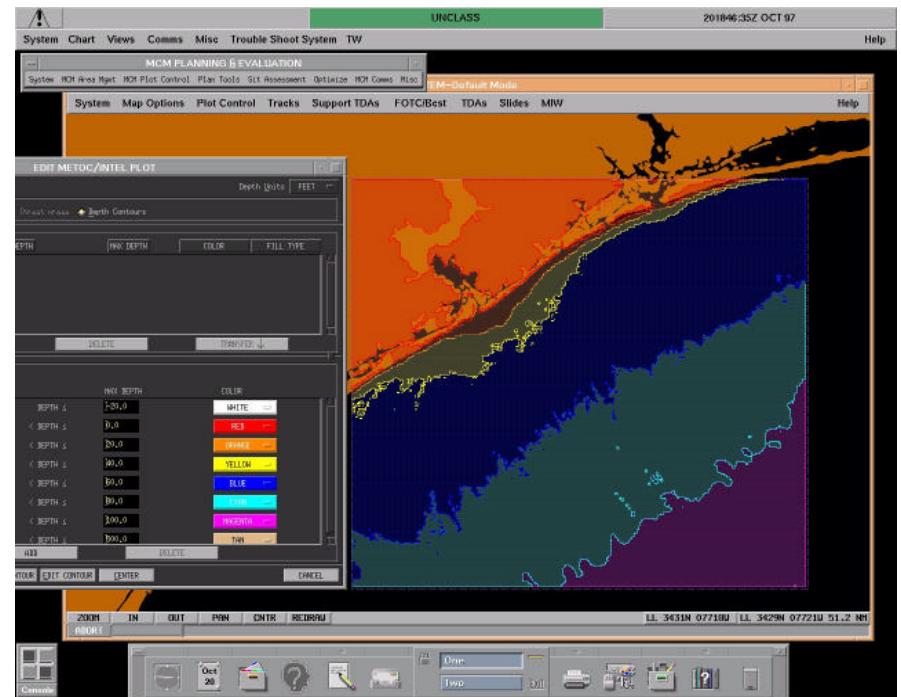
- Warfighter's Organic MCM Package (BGs/ARGs)
 - Three AMCM H-60 Helicopters
 - ALMDS and RAMICS (Shallow Volume MCM)
 - AQS-20/X and AMNS (Deep and Bottom MCM)
 - SWIMS
 - Three Remote Minehunting Systems
 - One Long Term Mine Reconnaissance System
- MCM Force-21 Study
 - Composition - Force MCM Mix
 - Concept of Operations

Fleet Engagement Strategy Mission

Develop and Execute An Engagement Strategy To:

- Provide Organic MCM Sensors and Weapons to the Fleet

Elevate the Mine Warfare Discipline
Establish Mine Warfare Advocacy

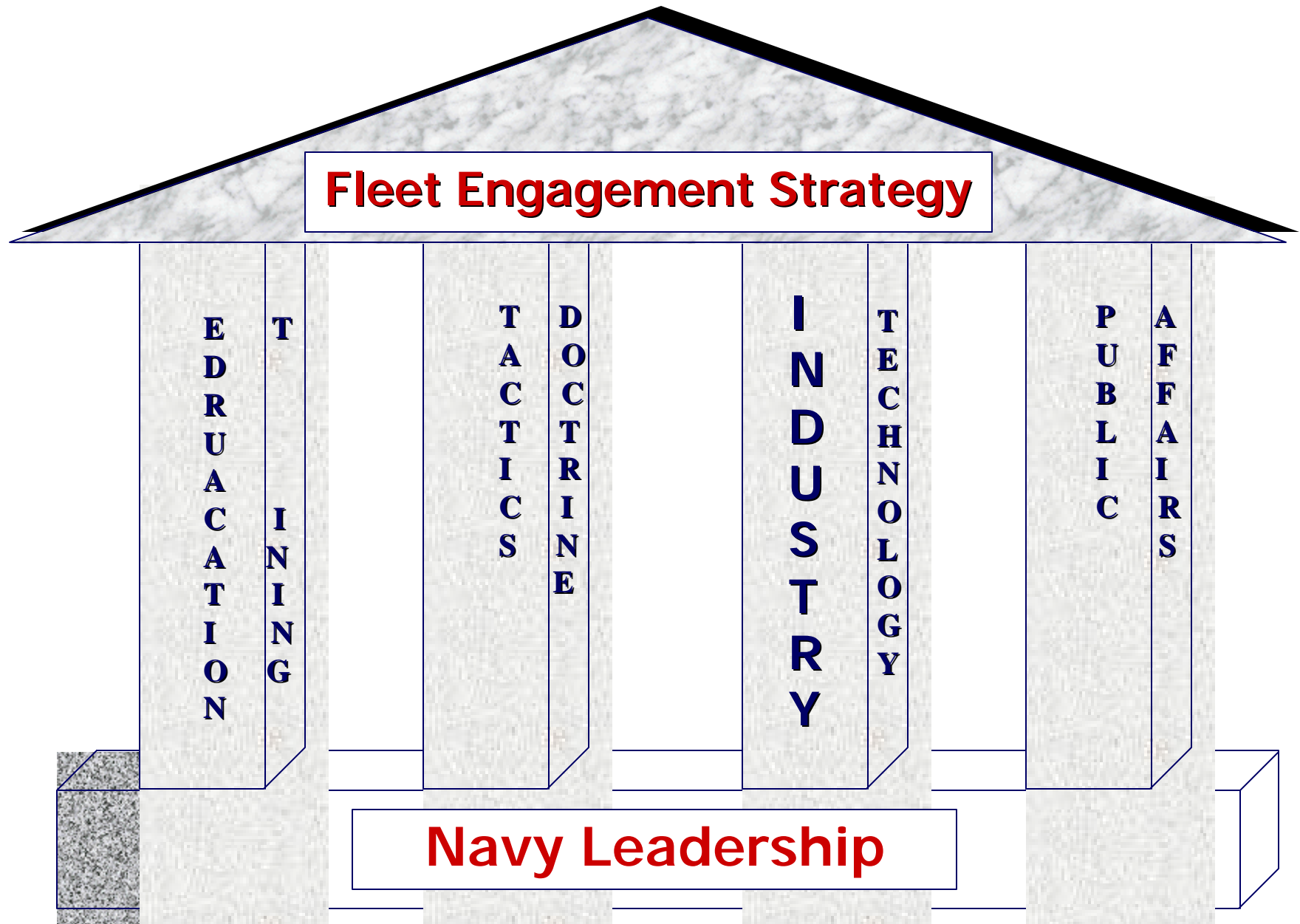


Fleet Engagement Strategy

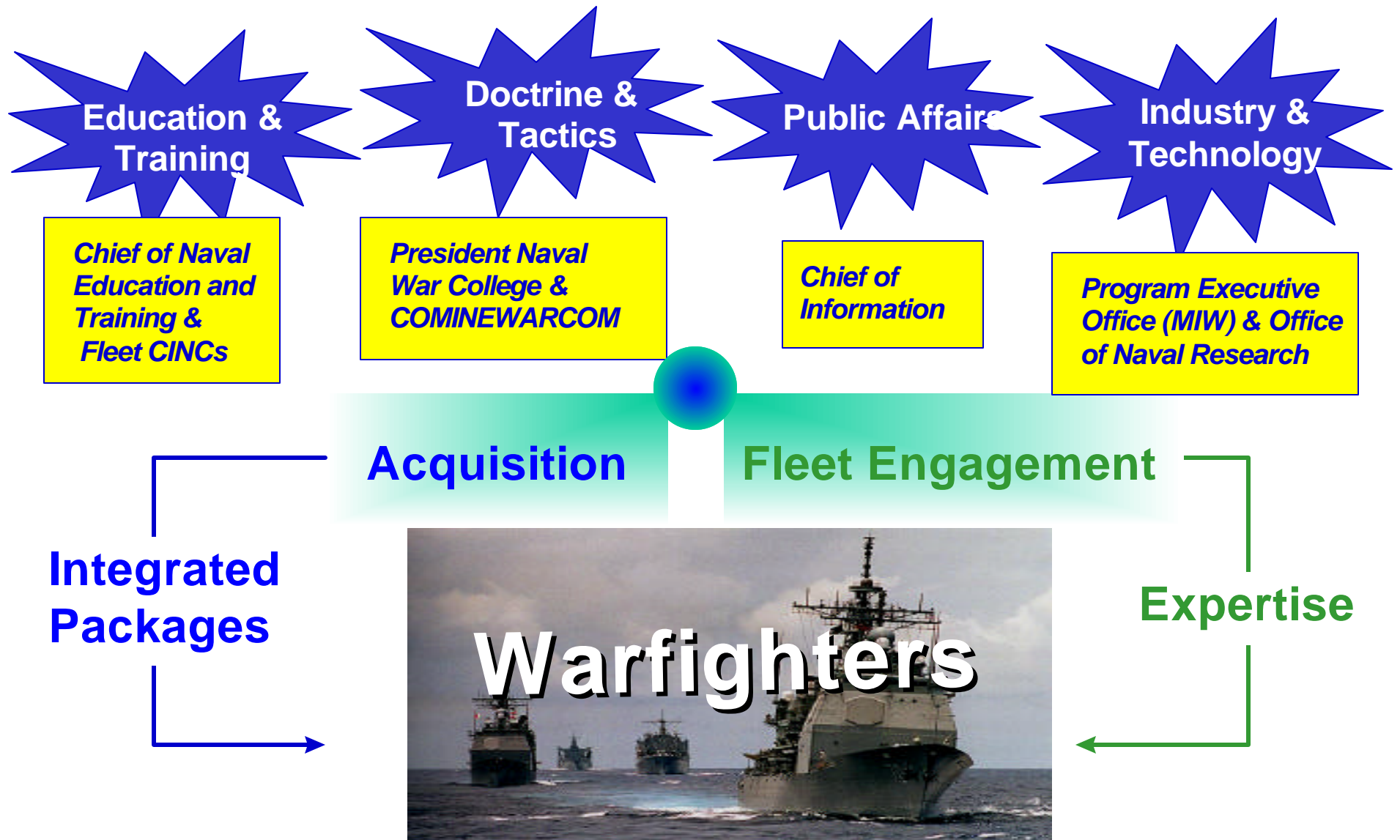
Keys To Success:

- Validation by Navy Leadership
 - Lead Organizations Develop and Execute Detailed, Comprehensive POA&Ms
- Total Commitment Throughout Navy
- Timing is Critical
- **Support From Industry**

Mine Warfare For The 21st Century



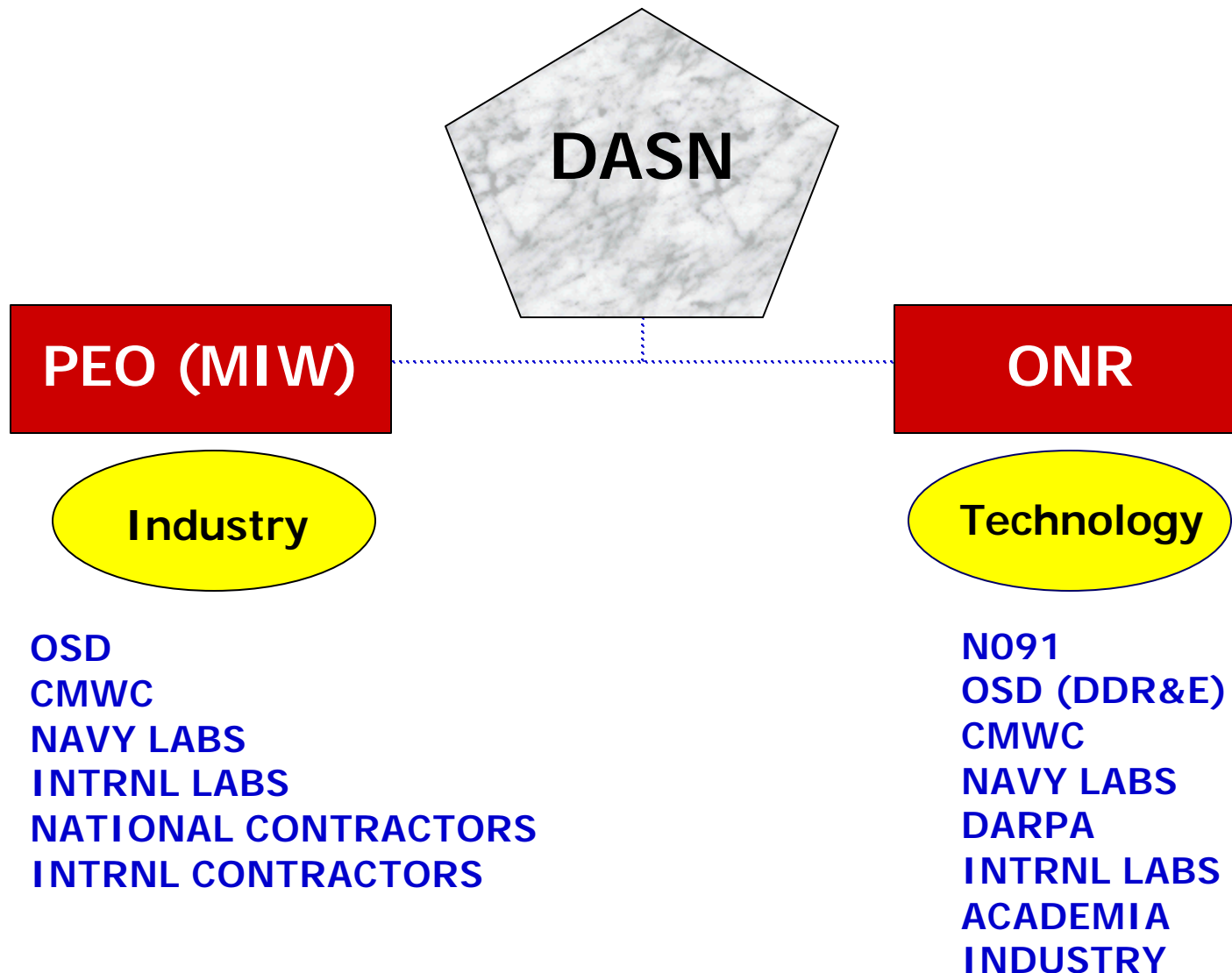
Fleet Engagement Strategy



Industry and Technology

- Limited Focus on Fleet Interfacing Efforts in Industrial and Technology Areas
- Enhance Interaction Between the Technology/Industrial Bases and the Fleet
- Organic MCM Is a Technological Challenge...Technology Push Is High Risk
- Involve Industry to Reduce the Technological Risk
-

Industry and Technology



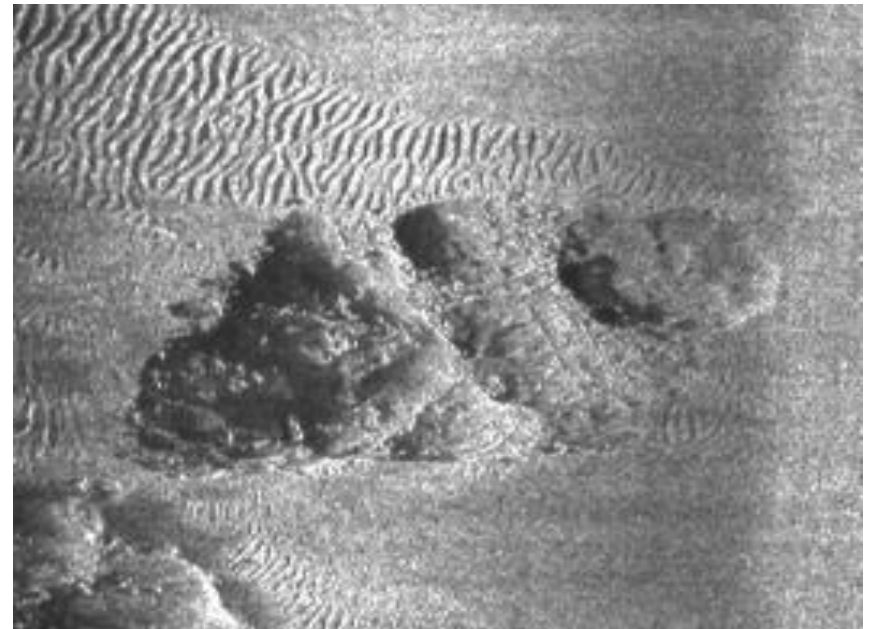
Mine Warfare Technology Challenges

- C4I
 - Robust Communications Between MCM Ships and Aircraft
 - Connectivity Between Dedicated and Organic Platforms
 - Interoperability
- Precise Underwater Navigation
- Data Fusion for Common Tactical Picture
- Bottom Mapping



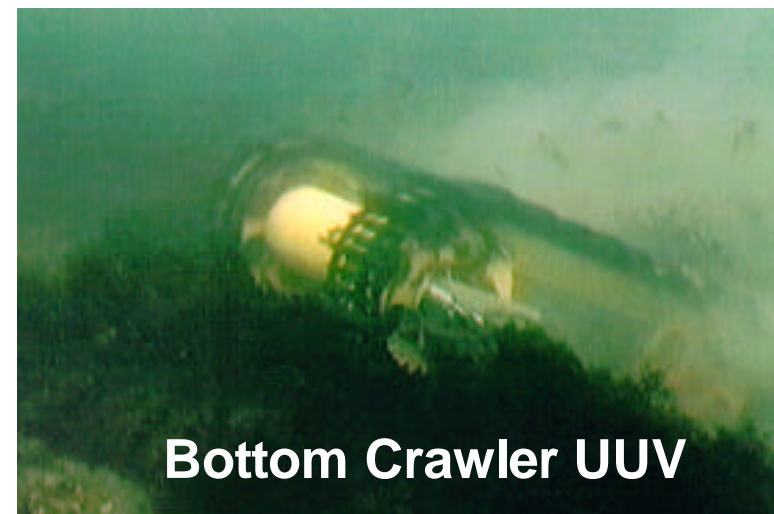
Mine Warfare Technology Challenges (cont.)

- Effective MH-53 Replacement
- Mine Detection/Classification/ID/Neutralization in VSW Region
- In-Stride Mine ID
- Environmental Exploitation
- Buried Mine Detection
- Pressure Mine Sweep
- Remote Control of Mines
- Emerging Mine Threat Technologies



Very Shallow Water (VSW) Zone Technology Challenges

- VSW MCM Unmanned Underwater Vehicles (UUVs)
- Command Initiated Neutralization Charges
- Clandestine Lane Marking

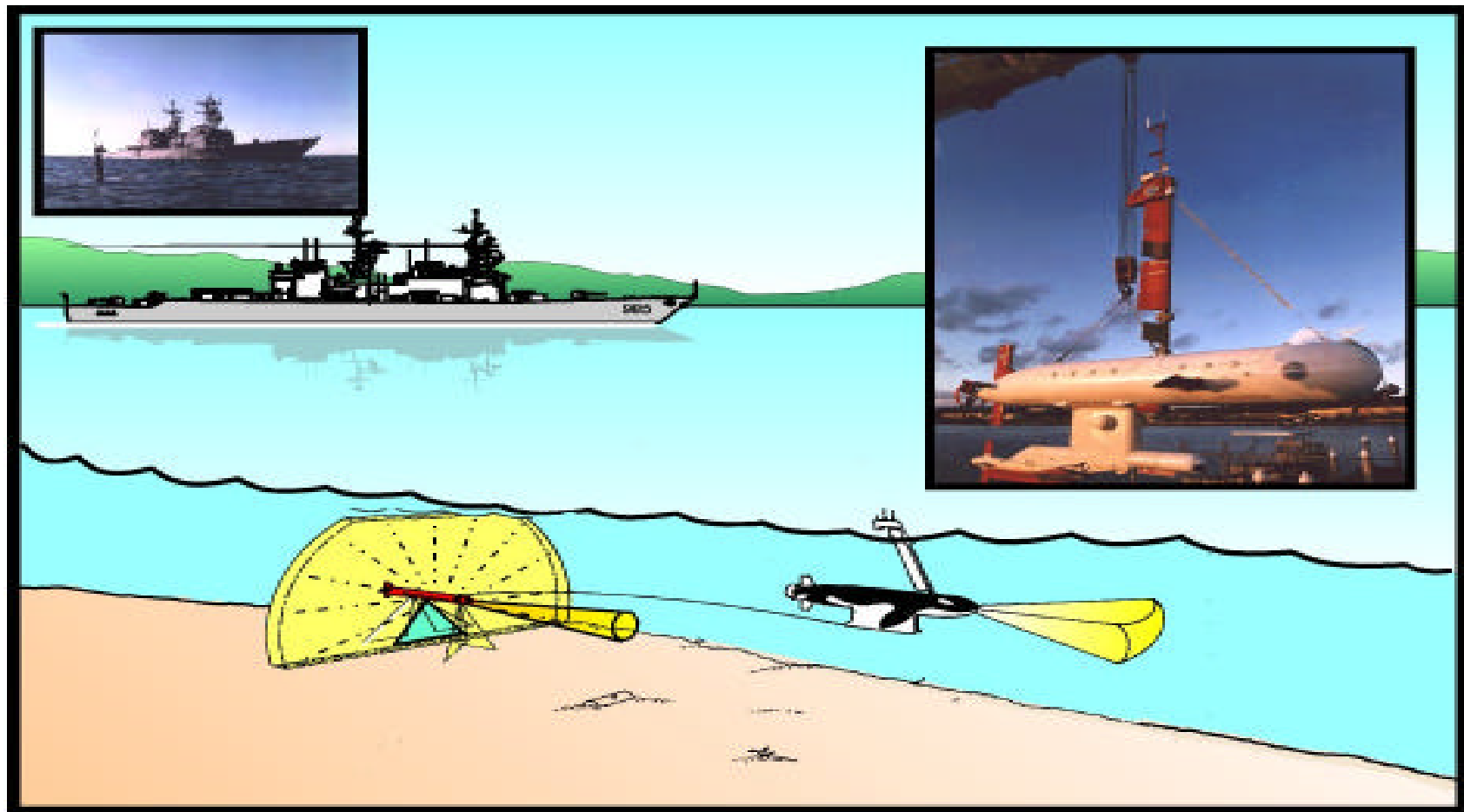


Very Shallow Water (VSW) Zone Technology Challenges (cont.)

- Detection and Imaging for Ordnance Identification
- Portable Geodetic-Based Underwater Navigation Equipment
- Detection/Classification of Buried Ordnance
- Low Magnetic Signature Engine Diver Propulsion Vehicle
- Signature Reduction of Small Boats



Remote Minehunting System



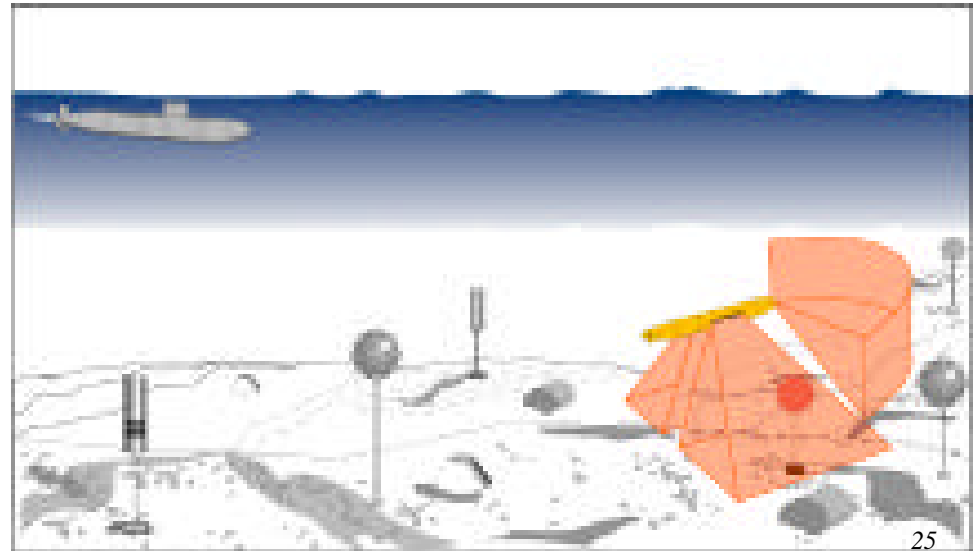
Remote Minehunting System Technology Challenges

- Robust Onboard Data Processing
 - Computer Aided Detection/Classification
 - Automated Processes
- OTH High-Data-Rate Comms Capability
- False Alarm Rate Reduction
- RMS Size Reduction
-



Long-Term Mine Reconnaissance System Technology Challenges

- Robust Onboard Data Processing
- Real-Time/Near-Real-Time Comms to Platform
- False Alarm Rate Reduction
- Power Supply
- Recharge Times



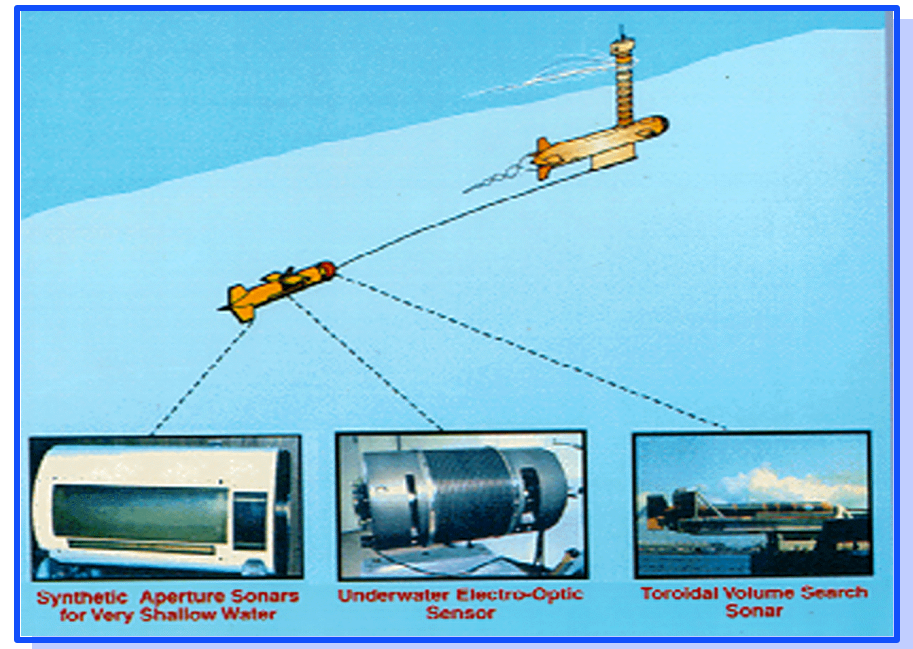
AMCM Technology Challenges

- H-60 Variant for Mine Countermeasures
 - Effectiveness of Organic H-60 AMCM Systems
 - H-60 AQS-20 & SWIMS Tow Capabilities
 - SWIMS to Replace the MK-105 Capabilities
 - Miniaturization of AMCM Systems for the H-60
 - AQS-20 / SWIMS
 - Increased Mission Time On Station
 - AMCM Systems Integration
 - Organic Systems Common Console
 - Integration into H-60 Common Cockpit and Mission Computer Architecture



Future Technology Challenges

- Adaptive Sensors and Systems
 - Environmental Adaptability
 - Re-configurable
- Autonomous Vehicles and Behaviors
- Underwater / OTH Communications
- Robotics
- Reducing Total Ownership Costs



Summary

- Mine Warfare Is Becoming a Navy Core Competency
- Navy Maintains Best Dedicated MCM Force
 - Improve MCM Capability in VSW Region
- Fleet Engagement Strategy is Fundamental to Success
- Introduce Organic Systems
- **We Must Manage the Technological Risk**